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Information technologies — JPEG Systems —

Part 2: Transport mechanisms and packaging

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Partie 2: Mécanismes de transport et paquetage

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

A list of all parts of the ISO/IEC 19566 series can be found on the ISO website.

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Introduction

Access to images and metadata using channels with limited bit rates can be significantly speed up by allowing proper decoding of partial representations. In this case, parts of the image can be displayed to the user or processed by an algorithm as soon as parts of the codestream or of the file are available at the client side.

Rec. ITU-T T.808 | ISO/IEC 15444-9 standardizes mechanisms called JPIP for incrementally communicating box-structured files, as well as information found within codestreams that may or may not be embedded within boxes of a box-structured file. By these means, standardized methods for accessing meaningful parts of an image are available.

So far, Rec. ITU-T T.808 | ISO/IEC 15444-9 is part of the JPEG 2000 standards. Other standards like JPEG (Rec. ITU-T T.81 | ISO/IEC 10918-1) or JPEG-XR (ISO/IEC 29199) are either not supported at all, or only in a very limited way. Consequently, application of JPIP is predominantly restricted to JPEG 2000. In the ambition to create an ecosystem of tools that can be applied to many or all standards of the JPEG family, this document gives guidelines for design of future compression standards and transmission formats such that partial access to images can be provided in a uniform manner based on the concepts and ideas of JPIP as defined in Rec. ITU-T T.808 | ISO/IEC 15444-9.

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Information technologies — JPEG Systems —

Part 2:
Transport mechanisms and packaging

1 Scope

This document collects important information with the goal of elaborating a system layer for JPEG standards, referred to as JPEG systems.

This document summarizes the principles of incremental codestream and file transport that are intended to form the future building blocks JPEG systems. Industrial implementations, future codecs and systems components are encouraged to follow these guidelines.

2 Normative references

There are no normative references in this document.

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp/

3.1.1
bit stream
partially encoded or decoded sequence of bits comprising an entropy-coded segment

3.1.2
box
structured collection of data describing the image or the image decoding process

Note 1 to entry: See ISO/IEC 19566-1 for the definition of boxes.

3.1.3
box-based file format
file format whose composing elements are well-defined, hierarchically structured boxes

3.1.4
byte
group of 8 bits

3.1.5
coder
embodiment of a coding process

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3.1.6
codestream
sequence of bits, representing a compressed image and associated metadata

3.1.7
coding
encoding or decoding

3.1.8
coding model
procedure (3.1.27) used to convert input data into symbols to be coded

3.1.9
(coding) process
general term for referring to an *encoding process* (3.1.16), a *decoding process* (3.1.14) or both.

3.1.10
compression
reduction in the number of bits used to represent source image data

3.1.11
component
two-dimensional array of *samples* (3.1.28) having the same designation in the output or display device

Note 1 to entry: An image typically consists of several components, e.g. red, green and blue.

3.1.12
continuous-tone image
image whose *components* (3.1.11) have more than 1 bit per *sample* (3.1.28)

3.1.13
decoder
embodiment of a *decoding process* (3.1.14)

3.1.14
decoding process
process which takes as its input compressed image data and outputs a *continuous-tone image* (3.1.12)

3.1.15
encoder
embodiment of an *encoding process* (3.1.16)

3.1.16
encoding process
process which takes as its input a *continuous-tone image* (3.1.12) and outputs compressed image data

3.1.17
entropy-coded (data) segment
independently decodable sequence of entropy-encoded bytes of compressed image data

3.1.18
entropy decoder
embodiment of an *entropy decoding* (3.1.19) procedure

3.1.19
entropy decoding
lossless procedure which recovers the sequence of symbols from the sequence of bits produced by the *entropy encoder* (3.1.20)

3.1.20
entropy encoder
embodiment of an *entropy encoding* (3.1.21) procedure

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3.1.21
entropy encoding
lossless procedure which converts a sequence of input symbols into a sequence of bits such that the average number of bits per symbol approaches the entropy of the input symbols

3.1.22
Joint Photographic Experts Group
JPEG
informal name of the committee that created this document

Note 1 to entry: The "joint" comes from the ITU-T and ISO/IEC collaboration.

3.1.23
JPEG standards
collection of ISO/IEC/ITU standards developed by the *Joint Photographic Experts Group* (3.1.22) for still imaging application as listed in Clause 2

3.1.24
JPEG systems
common elements of a system layer for *JPEG standards* (3.1.23)

3.1.25
metadata
additional data associated with the image data beyond the image data

3.1.26
pixel
collection of *sample* (3.1.28) values in the spatial image domain having all the same sample coordinates

EXAMPLE A pixel may consist of three samples describing its red, green and blue value.

3.1.27
procedure
set of steps which accomplishes one of the tasks which comprise an *encoding* (3.1.16) or *decoding process* (3.1.14)

3.1.28
sample
one element in the two-dimensional image array which comprises a *component* (3.1.11)

3.1.29
superbox
box (3.1.2) that itself contains a contiguous sequence of boxes, and only a contiguous sequence of boxes

3.2 Abbreviated terms

ID	identifier
JP2	JPEG 2000 file format
JPEG	Joint Photographic Experts Group
JPIP	JPEG 2000 interactive protocol
JPX	extended JPEG 2000 file format
MJ2	motion JPEG 2000 file format

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